

BEFORE YOU START...BE SAFETY SMART

Carbon Monoxide Hazards from Small Gasoline Powered Engines

Many people using gasoline-powered tools such as high-pressure washers, concrete cutting saws (walk-behind/hand-held), power trowels, floor buffers, welders, pumps, compressors, and generators in buildings or semiencllosed spaces have been poisoned by carbon monoxide (CO). CO can rapidly accumulate (even in areas that appear to be well ventilated) and build up to dangerous or fatal concentrations within minutes. Examples of such poisonings include the following:

- A farm owner died of CO poisoning while using an 11-horsepower, gasoline-powered pressure washer to clean his barn. He had worked about 30 minutes before being overcome.
- A municipal employee at an indoor water treatment plant lost consciousness while trying to exit from a 59,000-cubic-foot room where he had been working with an 8-horsepower, gasoline-powered pump. Doors adjacent to the work area were open while he worked. His hospital diagnosis was CO poisoning.
- Five workers were treated for CO poisoning after using two 8 horse-power, gasoline-powered, pressure washers in a poorly ventilated underground parking garage.
- A plumber used a gasoline-powered concrete saw in a basement with open doors and windows and a cooling fan. He experienced a severe headache and dizziness and began to act in a paranoid manner. His symptoms were related to CO poisoning.

These examples show a range of effects caused by CO poisoning in a variety of work settings with exposures that occurred over different time periods and with different types of ventilation. Workers in areas with closed doors and windows were incapacitated within minutes. Opening doors and windows or operating fans does NOT guarantee safety. CO is a dangerous poison. Operating gasoline-powered engines and tools indoors is RISKY BUSINESS.

Recommendations

It is not widely known that small gasoline-powered engines and tools present a serious health hazard. They produce high concentrations of CO--a poisonous gas that can cause illness, permanent neurological damage, and death. Because it is colorless, odorless, and nonirritating, CO can overcome exposed persons without warning. Often there is little time before they experience symptoms that inhibit their ability to seek safety. Prior use of equipment without incident has sometimes given users a false sense of safety; such users have been poisoned on subsequent occasions. Recommendations for preventing CO poisoning are provided below for employers, equipment users, tool rental agencies, and tool manufacturers.

All Employers and Equipment Users Should:

- NOT allow the use of or operate gasoline-powered engines or tools inside buildings or in partially enclosed areas unless gasoline engines can be located outside away from air intakes. Use of gasoline-powered tools indoors where CO from the engine can accumulate can be fatal.

An exception to this rule might be an emergency rescue situation in which other options are not available--and then only when equipment operators, assisting personnel, and the victim are provided with supplied-air respirators.

- Learn to recognize the symptoms and signs of CO overexposure: headache, nausea, weakness, dizziness, visual disturbances, changes in personality, and loss of consciousness. Any of these symptoms and signs can occur within minutes of usage.
- Always place the pump and power unit of high-pressure washers outdoors and away from air intakes so that engine exhaust is not drawn indoors where the work is being done. Run only the high-pressure wash line inside.
- Consider the use of tools powered by electricity or compressed air if they are available and can be used safely. For example, electric-powered tools present an electrocution hazard and require specific precautions for safety.
- If compressed air is used, place the gasoline-powered compressor outdoors and away from air intakes so that engine exhaust is not drawn indoors where the work is being done.

- Use personal CO monitors where potential sources of CO exist. These monitors should be equipped with audible alarms to warn workers when CO concentrations are too high.

Employers Should Also:

- Conduct a workplace survey to identify all potential sources of CO exposure.
- Educate workers about the sources and conditions that may result in CO poisoning as well as the symptoms and control of CO exposure.
- Always substitute less hazardous equipment if possible. Use equipment that allows for the placement of gasoline-powered engines outdoors at a safe distance from air entering the building.
- Monitor employee CO exposure to determine the extent of the hazard.

Equipment Users Should Also:

- Substitute less hazardous equipment whenever possible. Use electric tools or tools with engines that are separate from the tool and can be located outside and away from air intakes.
- Learn to recognize the warning symptoms of CO poisoning.
- If you have any symptoms, immediately turn off equipment and go outdoors or to a place with uncontaminated air.
- Call 911 or another local emergency number for medical attention or assistance if symptoms occur. Do NOT drive a motor vehicle--get someone else to drive you to a health care facility.
- Stay away from the work area until the tool has been deactivated and measured CO concentrations are below accepted guidelines and standards.
- Watch coworkers for the signs of CO toxicity.

Tool Rental Agencies Should:

- Put warning labels on gasoline-powered tools. For example:

WARNING--CARBON MONOXIDE PRODUCED DURING USE CAN KILL--DO NOT USE INDOORS OR IN OTHER SHELTERED AREAS.

- Tell renters that gasoline-powered tools should NOT be used indoors and explain why.
- Recommend safer tools for the intended use if available.

- Have portable, audible CO monitors for rent and encourage their use.
- Provide renters with educational materials like this information sheet.

Tool Manufacturers Should:

- Design tools that can be used safely indoors.
- Provide warning labels for existing and new gasoline-powered equipment. For example:

WARNING--CARBON MONOXIDE PRODUCED DURING USE CAN KILL--DO NOT USE INDOORS OR IN OTHER SHELTERED AREAS.

- Provide recommendations for equipment maintenance to reduce CO emissions.
- Recommend the use of portable, audible CO monitors with small gasoline-powered engines.

[ALERT: Preventing Carbon Monoxide Poisoning from Small Gasoline-Powered Engines and Tools](#)

DHHS (NIOSH) Publication No. 96-118 (1996)

Describes health effects and current standards and guidelines relating to carbon monoxide, as well as recommendations for workers, employers, and manufacturers regarding small gasoline powered engine safety.

[Two Carpenters Died Of Carbon Monoxide Poisoning Secondary To Running A Gas Powered Engine In A Confined Space \(Basement Of A Home\)](#)

Wisconsin FACE 92WI119

Fatality Assessment and Control Evaluation (FACE) containing a case history, investigation report and recommendations.

[Carbon Monoxide Kills Three Volunteer Firefighters Inside Well in Pennsylvania](#)

FACE 9030

Fatality Assessment and Control Evaluation (FACE) containing a case history, investigation report and recommendations.

[NIOSH Update - NIOSH Warns of Deadly Carbon Monoxide Hazard from Using Pressure Washers Indoors](#)

DHHS (NIOSH) Publication No. 93-117 (1993)

Describes the hazards of even small amounts of carbon monoxide poisoning that commonly occur from the use of gasoline powered pressure washers in enclosed spaces.

Source: *NIOSH*

Motivation is what gets you started. Habit is what keeps you going.
-*[Jim Ryun](#)*

Eye Safety

Each day about 2000 U.S. workers have a job-related eye injury that requires medical treatment. About one third of the injuries are treated in hospital emergency departments and more than 100 of these injuries result in one or more days of lost work. The majority of these injuries result from small particles or objects striking or abrading the eye. Examples include metal slivers, wood chips, dust, and cement chips that are ejected by tools, wind blown, or fall from above a worker. Some of these objects, such as nails, staples, or slivers of wood or metal penetrate the eyeball and result in a permanent loss of vision. Large objects may also strike the eye/face, or a worker may run into an object causing blunt force trauma to the eyeball or eye socket. Chemical burns to one or both eyes from splashes of industrial chemicals or cleaning products are common. Thermal burns to the eye occur as well. Among welders, their assistants, and nearby workers, UV radiation burns (welder's flash) routinely damage workers' eyes and surrounding tissue.

In addition to common eye injuries, health care workers, laboratory staff, janitorial workers, animal handlers, and other workers may be at risk of acquiring infectious diseases via ocular exposure. Infectious diseases can be transmitted through the mucous membranes of the eye as a result of direct exposure (e.g., blood splashes, respiratory droplets generated during coughing or suctioning) or from touching the eyes with contaminated fingers or other objects. The infections may result in relatively minor conjunctivitis or reddening/soreness of the eye or in a life threatening disease such as HIV, B virus, or possibly even avian influenza.

Engineering controls should be used to reduce eye injuries and to protect against ocular infection exposures. Personal protective eyewear, such as goggles, face shields, safety glasses, or full face respirators must also be used when an eye hazard exists. Eye protection should be fit to an individual or adjustable to provide appropriate coverage. It should be comfortable and allow for sufficient peripheral vision. Selection of protective eyewear appropriate for a given task should be made based on a hazard assessment of each activity, including regulatory requirements when applicable.

Source: **NIOSH**

ABOUT THIS NEWSLETTER

This newsletter is brought to you by the staff of the Safety and Environmental Compliance Office (SECO). The issues will be produced on a quarterly basis and posted on <http://www.seco.noaa.gov/> to help increase awareness of the environmental, safety and health programs. If you have any questions or comments, please contact the SECO at (301)713-2870.

Office Environment & Worker Safety & Health

Maintaining a healthy office environment requires attention to chemical hazards, equipment and work station design, physical environment (temperature, humidity, light, noise, ventilation, and space), task design, psychological factors (personal interactions, work pace, job control) and sometimes, chemical or other environmental exposures.

A well-designed office allows each employee to work comfortably without needing to over-reach, sit or stand too long, or use awkward postures (correct ergonomic design). Sometimes, equipment or furniture changes are the best solution to allow employees to work comfortably. On other occasions, the equipment may be satisfactory but the task could be redesigned. For example, studies have shown that those working at computers have less discomfort with short, hourly breaks.

Situations in offices that can lead to injury or illness range from physical hazards (such as cords across walkways, leaving low drawers open, objects falling from overhead) to task-related (speed or repetition, duration, job control, etc.), environmental (chemical or biological sources) or design-related hazards (such as nonadjustable furniture or equipment). Job stress that results when the requirements of the job do not match the capabilities or resources of the worker may also result in illness.

Source: **NIOSH**

NOAA SAFETY STATISTICS	
Based on accidents per one hundred employees	
REPORTABLE INCIDENTS	
First 10 months in 2004	First 10 months in 2005
2.07	1.62
	21% decrease
LOST TIME INCIDENTS	
First 10 months in 2004	First 10 months in 2005
0.82	0.67
	19% decrease

FACTOID

The great majority of accidents at NOAA involve an employee error element instead of an unsafe condition as the major cause. OSHA statistics verify this for all workplaces in the United States. Attention to the avoidance of human errors is a main reason for the implementation of effective safety and health programs.